HORIZON
MELL LOGGING

COMPANY: ENERFIN RESOURCES NORTHWEST
WELL: Columbia County #32-27-6S5 RD-1
LOCATION: 2439.89 W and 1881.7'S from the NE corner of Section 27, T6N, R5W, BAM
ELEVATION: G.L. 739' K.B. 749'
FIELD: WIST
COUNTY: Columbia, Oregon
API NUMBER: 36-009-00332
SPUD DATE: May 13, 1998
LOGGING DATES: 5-13-98 on 5-26-98
LOGGING DEPTHS: 500' to 2092'
GEOLOGIST: Dave Huggins
COMPANY MAN: Rob Lucas, Production Specialist
CONTRACTOR: Taylor Drilling Inc.
RIG: #7
LOGGING GEOLOGISTS: Bill Gilbour, Rick Jones
BIT SIZE: 9.4/5" to 493', 6.25" to 2092'
CASING: 7" 20#/ft set @ 493'
CALIBRATION: 20 METHANE = 100 UNITS

ABBREVIATIONS

CO Circulate Out
LAT Logged After Trip
LAS Logged After Survey
CG Connection Gas
KC Kelly Cut gas
WG Wiper Gas
TG Trip Gas
SG Survey Gas
WR Wiper Run
CORE INTERVAL
MDB (100, 000# full scale)
TRIP

SYMBOLS

PEBBLES >2mm
SAND
SANDSTONE
SILTSTONE
MUDSTONE
SHALE
MARL
CLAY
CHERT
DOLOSTONE
LIMESTONE
VOLCANICS
TUFF
BASALT

GASES

DITCH GAS
OFFSCALE
CUTTINGS GAS
OFFSCALE

CHROMATOGRAPH

METHANE
ETHANE
PROPANE
BUTANE
PENTANE

DRILL RATE: ROP 300 0; MOB 100K
LITHOLOGY
MINERAL: Siderite, Glauconite, Pyrite, Shale, Apatite
GASES: 20 40 60 80 1000 10000 100K
CHROMATOGRAPH
REMARKS

REMARKS

DESCRIPTIONS
SURVEYS
MUD CHECKS
MISCELLANEOUS

NOTE: all gas events (WG, SG, CG & carrybed recorded as above background, in ss units; all soils described wet unless otherwise noted; gas equip calibrated to SPWLA standards; depths are taken from drillers' pipe tally & referenced from KB.

Well #32-27-6S is being re-drilled to the NW direction; spd @ 500' @ 1000rpms on 5/23-98.

CLAY, med brnsh gry; soft; mod thick, lumpy consis, fair dispersion, mod ad; to soil-gelatinous, sl calc, mnr tuff; slowly sl calc, mnr tuff; particles, tr floating carb mtrl

SILTSTONE, mod yelsh brn; frbl, fri sxy, variably argil, occ clean; sl calc, nonreact; dom subblky, pt laminat; organic detritus, tr tuffaceous, dom clay, tr chlorite; grds fn sl silty ss; tr mica.

SAND, clr, cloudy, tr blk; v fn to fn, sbang to sbrnd; poly mxtd, unconsol, tr frsb cmt; calc cmt; dom abrasion; dom dstl qtz, dom volcanics, poss altrd shell frags.

WM 8.7 Vis 39 PV 19 YP 5 FL 8.4 pH 10.5 Cl-800ppm

NOTE: tran change @ 675' from yelsh brn soft, salty, clay to firm, med olv gry siltstone w/occ glauconite & tr shell frags.

SILTSTONE, bcmng med lt gry to med gry, lighter when dried; frm, brgl, sbblky, occ fis; mod calc, tr sh(l) frags; tr carbonaceous mtrl; tr pyrite; tr tuffaceous debris; grds fm silty clyston to argil, silty, fn ss.

SANDSTONE, med lt gry, v fn to fn, gr(l), mtx bcmng tuffaceous; v poly sxtd; sbang to sbrnd; mod wl indur; calc cmt, volcnc grs; tr carb mtrl; fr pyr; abnv; rr shell frags; tr glauc.

SILTSTONE, med gry to olv gry; frm, occ mod hrd, dom argil; com fn sdy, stnuitive sm to occ lrge blky, sbang clsts, abrmy, occ interlaminated calc; tr carb mtrl; tr fn glauc; rr pyr; occ volcnc lithic grs, grds to silty clyston & silty fn ss.

NOTE: tr wht sucrosic Ls @ 840'.

WM 8.9 Vis 38 PV 12 YP 4 FL 5 pH 8.0 Cl-1000ppm

NOTE: POOH @ 882' to change kick-sub.

CLAYSTONE, med olv gry; firm, blocky, hd, calc, sl dispersive; tr tuffaceous, small lt gry clsts dull earthy lstr; irreg to blky clgs; occ fn to 2mm ss clsts; dsrsd v fn carb mtrl; occ w/tuffaceous lams.

TUFF, tr amts; pl org; firm to occ sft mtx; dull bluish lstr; occ blky; occ as thin interlams; noncalc; silty in part.

TUFF, bcmng com, lt gry; brittle; firm; occ crsnly; tr w/volcnc debris; noncalc; sdy; occ mottled.

MUDSTONE, bcmng incrsng brn sues; soft & mushy; frm & mod competent; silty, tr fn sd; incrsngly tuffaceous; sl swelling, mass to occ grong w/tuff; tr to rr glauc; grds v fn carb mtrl.

MUDSTONE, olv yelsh brn, soft to firm, competent; massv; in silty dcrse to sd, noncalc occ glaut to 2.5mm; dcrsd v fn carb mtrl; grds occ to mod sft structureless clgs; dull earthy lstr.

NOTE: color change to grysh brn from 8k yelsh brn @ 1085'-1080'.

SILTSTONE, grysh brn, firm; v sft; grdng to sly mudst; noncalcareous; occ fn sdy; tr glauc, noncalc.

NOTE: sig color change from grysh brn to med lt gry w/ sig incrs in clay & accomp dcrs in ss @ 1110'-1120'.

CLAY, med lt gry to fntly brnsh gry, soft, sticky; com large, rounded lumps; in places fn sd & silty; v lo solubility; calc; tr mica.

SANDSTONE, med gry to med lt gry, v fn to fnU, sl silty, v poly arkd; frsb; dom disaggregates; calc mica; com chlorstzn of micas; com volcnc lithic grs, grds to arkd mtrl; poss tuffaceous mtrx.

Wiper trip @ 1193'

MUDSTONE, bcmng brnsh gry to gry brn; v silty, fn sdy; dom soft & mushy; micac, micas incompetent, noncalc; tr chlor in clay debris; dom goes into making clay.

SAND, clr, cloudy, rr blk; v fn to vfn, sbang to sbrnd; v argil, v poly strd; loose unconsol, rr frsb cmt; calc; dom dstl qtz, dom micas, micas books, occ chloritic; tr calcite; mnr carb mtrl.

CLAY, lt olv gry macro, pl yelsh brn, micro; v soft; v sticky, com large clay clumps; tuffaceous; sdng fn to silty; decrs mica, incompetent, noncalc; tr chlor in clay debris; dom goes into making clay.

SILTSTONE, med dk gry brn; frbl, loose; v argil; com fn sdy, tuffaceous; occ calc; v poly strd; occ fn mawkey tuff frags; gen dcrsg finer w/depth; tr carb mtrl; tr pyr; mica; tr carb mtrl.

MUDSTONE, bcmng dk yelsh brn; dcrsd silt & sd, mod dense; competent; mnr fracsn of dom clay section; tr micro-veins & fillings calc; v poorly cleavable; isolated tuff grs; tr chlorite.

SANDSTONE, med olv gry, v fn to fnU, sbang to sbrnd, frsb, v argil; silty; wacke; calc cmt; dom clay matrix; dstl qtz & lithics, dom volcnc grs; com mica; occ chlorstzd grs; occ chlorit grs; tr lignite more com as carb mtrl; fr pyr; tuffaceous.

MUDSTONE, dk yelsh brn; firm; sl silty; dull earthy lstr; occ pl org tuff inclusion; tr microcarb mtrl; micromica; select sl calc.

MW 9.2 Vis 40

SAND, clr, cloudy, wht, grn, occ v fn to fnU, sbang to sbrnd, smcnsbl, argil, poly strd; dom qtz & plag; tr pyr; com mica, occ lignitic, strg tr chlorstzn, tr calcite; occ pl org volcnc lithics

SANDSTONE, @ 1563', wht, wl indur, calc cmt, fn to medU; gr & mtrx supptd; clean to manly, qtz; chlorite; carb mtrl; occ mica.

NOTE: POOH to L/D mudmotor P/U rotary assembly.

MW 9.1 Vis 39 PV 10 YP 6 FL 8.0 pH 7.0 Cl-500ppm

SANDSTONE, wht to v lt gry, v fn to medU, dom fnU, sbang to sbrnd, clean to exptnsts, poly to mod srtd; mod fri to wl indur, calc cmt; dom qtz, sl feldspathic, occ carb/altd micas; tr intrasl pyr; occ chlor, tr volcnc lithics.

SAND, clr, cloudy, pl grn, tr blk, pl org, yel, v fn to medU, sbang to rnd, mod argil, unconsol, com calc cmtd, poly srtd; kaolinitic, dom dstl plag, occ volcanic lithic grs, com mica; strg chloritstzn, tr free framboidal & intrasl pyr; rr carb mtrl.

NOTE: mod amt of Keasey Fm slough, sig incrs in sd output from desander.

SANDSTONE, wht to v lt gry, v fn to medU, sbang to sbrnd, fri to wl indur, calc cmtd, v poly srtd; com clean, com v kaolinitic, occ grn grs; dom qtz; com plag; com mica; dcrsd pyr, com chloritstzn; rr carb mtrl; tr yel, pl org volcnc grs.

CLAY, med gry overall, com wht kaolin clays, com v fn sd; authigenic calc, v pr cohesion to adhesion, mod solu; derived from kaolin ss.

MUDSTONE, med brn, sl firm, blocky, smdy, dull earthy lstr; sig assoc w/thin carb lams.

MW 9.3 Vis 40

SANDSTONE, wht, lt gry, soft to firm, fri to wl indur, occ mod hrd, occ rnggl; com clean to occ dentrtal; cly rich, occ plag; v com thin mica books; mnr chlor, tr pyr aggs; mnr tuff grs; incrs lignite.

LIGNITE, tr sm, thin; brittl, splty; assoc w/mod brn solu clyston; occ as v thin interlam w/ss & siltstn.

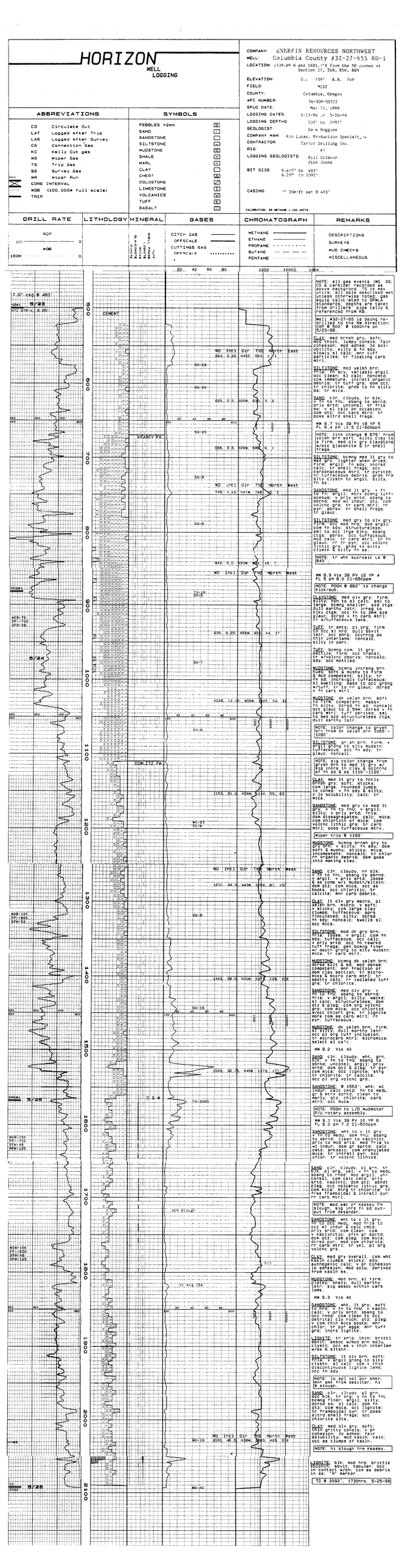
SILTSTONE, lt olv brn; soft; fria, v argil grdng to silty clyston; no calc, com v thin interlam lignitic lams; occ fn sdy.

NOTE: lo mbl vol gvn smkr, mnr amt from desilter, hi & slough.

SAND, clr, cloudy, pl grn, occ blk, tr org, v fn to fnL bcmng finer, argil, silty, dcrsd ss, pl calc cmt fm qtz, com mica, occ lignite; tr framboids; pyr; occ poss altrd shell frags; occ chlorite dsts.

CLAY, med olv gry; soft; thin gritty consis, v pr cohesion, lo adhes, fair solubility, mod kaolin calc; occ as clumps of kaolin.

NOTE: hi slough frm Keasey.

LIGNITE, blk, mod hrd, brittle sbconch, splty, tabular; occ as laminations w/ss, often as debris in ss; "U" marker.

TD @ 2092', 1730hrs, 5-25-98